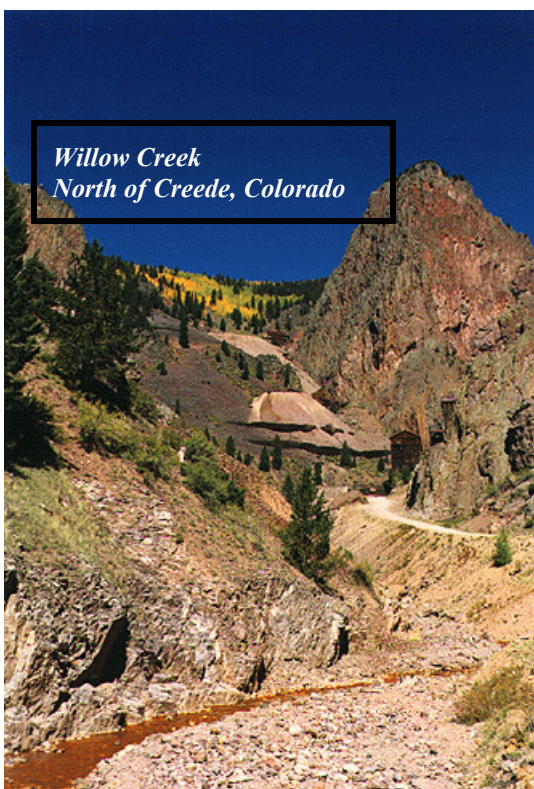


Willow Creek Watershed Revitalization Project Creede, Colorado

Land Revitalization = Remediation, Restoration and Reuse

The Willow Creek Watershed initiative is a demonstration project for EPA Region 8's Land and Water Reuse, Revitalization, Remediation and Restoration Agenda (LWR⁴). It is a sub-watershed of the Region's LWR⁴ Geographic Cluster Area, the San Juan Mountains. Willow Creek is a tributary of the Rio Grande River near its headwaters in the San Juan Mountains in Mineral County, Colorado. The central community in the watershed is Creede, Colorado.

The State of Colorado has placed this segment of the Rio Grande River on their impaired water bodies, Clean Water Act (CWA) 303(d) list. The residents of Creede and the surrounding portion of Mineral County, have developed a community-based effort to identify and address the most pressing environmental concerns in the Willow Creek watershed. The Willow Creek Reclamation Committee (WCRC) is directing efforts to improving water quality and physical habitat in the watershed as part of a long-term watershed, revitalization program.



Background

- Historic mining activities related to underground mining of silver and base metals resulted in water quality impairment and overburden dumping in the 35 sq. mile Willow Creek watershed.
- From 1999 through 2003 the WCRC, with technical and financial assistance from EPA, the USFS, the NRCS, the Colorado Division of Minerals and Geology and the Colorado Department of Public Health and Environment, directed a variety of watershed characterization efforts. These include: (1) identifying sources of heavy metals, (2) characterizing transport of heavy metals to surface waters (3) quantifying heavy metals loading to Willow Creek and the Rio Grande River, (4) characterizing mine waste materials, (5) bio-assessment of aquatic resources, (6) characterizing hydrological conditions in underground mines, and (7) identifying watershed land revitalization opportunities.

- Colorado completed a major stabilization of the Commodore dump which West Willow Creek runs through. Funds exceeding \$200 were provided by OSM. Argo Engineering completed preliminary flood control analyses and conceptual design for the area. Argo continues to refine their work based on discussions with stakeholders and are also considering an analysis at East Willow Creek.
- There are about 11 mine waste dumps in the Creede district, some quite large. The State of Colorado and EPA wrote a Sampling and Analyses Plan for all dumps. The SAP was approved by the State of Colorado and EPA's 319 program for implementation. The SAP called for sampling at each mine waste dump of paste pH, and laboratory analyses of metals. Contractors hired by the WCRC and Creede volunteers collected mine waste samples. Based on the results it is known that a couple of the piles are contaminated. Samples were collected from contaminated piles for hazardous waste TCLP analyses in 2002. The data confirmed the presence of a few contaminated areas in some piles.
- Region 8 has agreed to use CWA 319 funding to do contouring, consolidation and capping of mine dump waste causing water quality problems and is in the process of approving a CERCLA removal action on Willow Creek.

Stakeholders

- Stakeholders and partners in this sub watershed of R8's LR³A Geographic Cluster include CERCLA Brownfields, CERCLA Remedial/NPL, CERCLA Site Assessment, Ecosystem Protection Program, Ecosystem Stewardship Team, The Water Quality Unit, the CWA 319 Non-Point Source Program, The Regional Geographic Initiative funding program, The Legal Enforcement Program, and the environmental site assessment programs lead by the ORD's EMAP West Coordinator. Other Federal partners include the U.S. Geological Survey, U.S. Forest Service, Natural Resource Conservation Service and the Office of Surface Mining.
- Other key stakeholders and partners include the Colorado Department of Health and Environment, Colorado Division of Minerals and Geology and the Colorado Division of Wildlife, the Willow Creek Reclamation Committee <http://www.willowcreede.org/>, the Committee's Technical Advisory Committee, The Willow Creek Community Based Watershed Group, and Mineral County.

Initial Goals and Objectives

- Completion of specific site cleanups within a larger watershed management plan. Focus on restoration of aquatic resources, mine waste sites and land formations in the watershed. EPA Region 8 will specifically complete a Willow Creek Watershed Aquatic Resource Assessment to support the Willow Creek Watershed Restoration Plan.
- Educating the WCRC on EPA's One Cleanup Program and Land Revitalization principles and incorporating these principles into the Willow Creek Master Watershed Restoration Plan.
- Establishing creative solutions to environmental problems once focused on only by traditional enforcement approaches, integrating OSWER, OW and OECA efforts (see AOC below).
- Integrating the existing 11 mine waste/dump site remediations into a master watershed restoration plan. This includes integrating mine waste voluntary clean up site assessments with water resource site assessments to support local decision making.

Longer Term Goals - Helping to integrate programs and the LR³ Agenda to achieve:

- Prevention of fish kills to the Rio Grande
- Establishing the area as a nationally recognized gold medal fishery and tourist/recreational hotspot

Key Activities and Needs – Transition from characterization to selection, design and implementation of restoration and revitalization projects. This will be a significant effort and will include seeking funds.

- **Airport Corner Property** - The characterization of the airport corner property, which has a purchase agreement contingent on clean up, has been completed by the State of Colorado's (CDPHE) Voluntary Cleanup Program (VCUP). The soil underlying the property is contaminated and exceeds the action limit for lead. Two remedies are under consideration. A contractor for the potential buyer has completed a reclamation plan for the property. The Town of Creede has resolved re-zoning and easement issues associated with the property. The VCUP program will match the first \$100,000 that the property owner will spend to reclaim the site. EPA has been working with the potential owner to complete a **Prospective Purchaser Agreement (under CERCLA Brownfields)** that would allow the buyer to acquire the land , after cleaning it up , and transfer part of the property to the Mineral County Fairgrounds Association. **The PPA is in final stages of DOJ review.**
- **Hecla (Emperious Tailings & a Community Center for Creede)** - The WCRC installed 13 ground-water monitoring wells above, around, and below the tailings pile, which is located below town on the east side of Willow Creek. An aerial photo of the pile shows previously existing containment ponds to the south. These wells have been sampled at least once per year since 2001. Data from the sampling clearly indicate a narrow zinc plume extending southwest from the lower end of the pile. This work has been done because the Hecla Mining Company has not characterized the ground-water in the alluvium beneath the tailings pile and the potential affect on lower Willow Creek. The WCRC has done this (HECLA has been notified) because the Town has an interest in acquiring some Hecla property to build a community center. Discussions on land acquisition cannot proceed until EPA and the Town have an understanding of environmental impacts related to the tailings pile. 1988 data indicate the significant mineral and metal potential contained in the tails (sulphide, silver and gold).
- **Nelson Tunnel** - Partners in the effort completed characterization of the Nelson Tunnel and other areas in order to understand major continuing sources of contamination. Six characterization reports are complete on ground-water and surface water sampling, mine dump sampling, bio-sampling, underground investigations and historical features in Creede's mining district. The USGS finished a report on stream tracing and is publishing the report. The discharge from the Nelson Tunnel is the biggest metal load source into Willow Creek. About 70% to 80% of the zinc load delivered to the Rio Grande via Willow Creek comes from this discharge (200 -275 gpm.).

Remediation of the contaminated discharge from the Nelson adit is one of two key activities needed to successfully restore Willow Creek aquatic and riparian habitat (the other key element is restoration of the flood plain riparian zone on lower Willow Creek). The cost to eliminate or reduce this



Nelson Tunnel Mine Splash Pool

load will be high. Obtaining funds under a voluntary clean up program is a high priority for the WCRC.

- **Cleaning up Public Lands and the Homestake Legacy** - Homestake Mining Company has completed selected remedial activities in upper Windy Gulch (a tributary to Willow Creek). The USFS agreed that Homestake could proceed with reclamation of some waste piles on USFS land. The reclamation goal is to isolate the waste piles from the surface water in Windy Gulch and minimize any leachate generation due to infiltration of precipitation. Homestake completed these actions pursuant to a Technical Revision to the Reclamation plan filed with CDMG. For now, the USFS will not seek to have this work done under an AOC pursuant to their CERCLA authority - but will defer to the CDMG Reclamation Plan. Pursuant to this arrangement the USFS has not relinquished any future use of their CERCLA authority.

The WCRC TAC has reviewed and commented on the Statement of Work for the reclamation activities that was developed by Homestake's. Data suggests that the mine pool created by the stopping of the dewatering pumps in the Bulldog mine may be effecting the volume and chemistry of the Nelson portal discharge. However this has not been determined with certainty. The TAC is exploring the possibility of a trace from the Bulldog pool to the Nelson Tunnel.

- **Commodore Dump Stabilization** - The Colorado Division of Mining and Geology (CDMG) completed a major stabilization of the Commodore dump (west Willow Creek) in the summer of 2000. West Willow Creek flows through this dump. This work mitigated human health safety concerns related to the failure of the Commodore mine dump and made access to the Nelson tunnel much easier and safe. EPA has a direct interest due to its involvement in supporting the watershed restoration plan and minimizing the contamination from the Nelson tunnel.
- **Solomon Wetlands** - The WCRC hired a consultant to perform an evaluation of the current wetlands treatment cells (constructed in 1991 using EPA/State CWA non point source (319) funds). Based on the results of the evaluation the WCRC may seek funds to revitalize the Solomon wetlands. The WCRC has asked EPA to explore the use of an Administrative Order on Consent (AOC) for purposes of allowing the wetlands treatment system to be operated without an NPDES permit. EPA has encouraged the WCRC to continue to move forward. EPA R8 Enforcement has been assigned to this effort and EPA has approached the State of Colorado on the use of an AOC with positive interest.

- **Mine Waste Sampling** - There are about 11 mine waste dumps in the Creede district - a few which are quite large (Commodore, Last Chance and Amethyst). In 2000 the waste dumps were sampled using a Sampling and Analysis Plan (SAP) prepared by The State (CDMG) and EPA R8, and approved by CDPHE. Two types of sampling was done at each mine waste dump. Results of the field sampling indicate that a couple of the piles are potentially acid generating. These piles correspond to mines that mined ore high in pyrite. During the summer of 2002 samples were collected from the hot piles for RCRA TCLP analyses. The data from this effort confirmed the presence of hot areas in some piles. During the summer of 2003 the WCRC and the USFS completed a response action which included consolidated and capping of several small mine waste piles (Gormax, Phoenix, Midwest and Park Regent mines & Phoenix Park mill). This was a joint USFS /WCRC effort. The WCRC used EPA



CWA 319 funding. EPA Region 8 issued an Action Memorandum (written in the CERCLA / NCP prescribed format) to document approval of this response action and to establish that the response action was consistent with NCP requirements.

